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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,757	12/27/2001	Angela Hui	G0728/2236P	5788

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EXAMINER

PIZARRO CRESPO, MARCOS D

ART UNIT PAPER NUMBER

2814

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/032,757

Applicant(s)

HUI ET AL.

Examiner

Marcos D. Pizarro-Crespo

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondent address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-19 is/are pending in the application.
- 4a) Of the above claim(s) 7-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6 and 16-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 2-19 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

Application/Control Number: 10/032,757 (Final Rejection)
Art Unit: 2814

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Attorney's Docket Number: G0728/2236P
Filing Date: 12/27/2001
Claimed Foreign Priority Date: -- none --
Applicant(s): Hui et al.
Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment filed on 5/9/2003.

Election/Restrictions

1. This application contains claims 7-15 drawn to an invention nonelected with traverse in paper no. 5 filed on 1/28/2003. A complete reply to the final rejection must include a cancellation of the nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 2 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Lien (US 6338993).

4. Regarding claim 2, Lien shows (see, e.g., fig. 7) all aspects of the instant invention including a semiconductor device including a core and a periphery, the semiconductor device comprising:

- ✓ a plurality of core gate stacks in the core **30**, each of the plurality of core gate stacks including a first polysilicon gate **240** and a WSi layer **250** above the first polysilicon gate **240**
- ✓ a plurality of core spacers **400**, each of the plurality of core spacers **400** residing along an edge of the plurality of core gate stacks
- ✓ a plurality of sources **300** in the core **30**, the plurality of sources **300** residing between a portion of the plurality of core gate stacks
- ✓ a plurality of periphery gate stacks in the periphery, each of the plurality of periphery gate stacks including a second polysilicon gate **232** and a CoSi layer **500** on the second polysilicon gate **232**

5. Regarding claim 3, Lien shows each of the plurality of periphery gate stacks including an edge, the device further comprising a plurality of periphery spacers **420**, each of the plurality of periphery spacers **420** residing along an edge of the plurality of periphery gate stacks.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 4-6 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lien in view of Chang (US 5981339) and Yang (US 5977601).

9. Regarding claim 4, Lien shows most aspects of the instant invention (see paragraphs 4 and 5 above). In addition, Lien shows (see, e.g., fig. 7) each of the plurality of core gate stacks including the first polysilicon layer **240**, the WSi layer **250** above the polysilicon gate **240**, and a capping layer **260** above the WSi layer **250**. He, however, fails to show a layer of polysilicon between the WSi layer and the capping layer.

Chang, on the other hand, teaches that Lien's capping layer provides an anti-reflective coating while at the same time acting as a masking layer (see, e.g., col.6/ll.2-5). Chang also teaches that a polysilicon layer between Lien's WSi layer and his capping layer can be used to prevent any potential peeling or cracking of the underlying silicide layer (see, e.g., col.6/ll.1-2).

Like Chang, Yang teaches that Lien's capping layer will work as an antireflective coating. This coating may be used for many reduced-size critical dimensions, thus enabling the density of the gate stacks to be improved (see, e.g., fig. 2, col.4/ll.23-26, col.5/ll.39-46).

Accordingly, it would have been obvious at the time of the invention to one of ordinary to have a polysilicon layer between Lien's WSi layer and capping layer, as taught by Chang, to prevent cracking of the silicide layer.

10. Regarding claim 5, Lien teaches that the capping layer **260** is a SiN layer (see, e.g., col.3/ll.47).

11. Regarding claim 6, Yang teaches that the capping layer may be a SiON layer (see, e.g., col.4/ll.34).

12. Regarding claim 16, Lien shows (see, e.g., fig. 7) most aspects of the instant invention including a semiconductor device comprising:

- ✓ a plurality of core gate stacks in a core **30**, each of the core gate stacks comprising:
 - a first polysilicon gate **240**
 - a WSi layer **250** above the first polysilicon gate **240**
 - an additional capping layer **260**
- ✓ a plurality of sources **300** residing between a portion of the core gate stacks
- ✓ a plurality of periphery gate stacks in a periphery, each of the periphery gate stacks comprising:
 - a second polysilicon gate **232**

- a CoSi layer **500** above the second polysilicon gate **232**

Lien, however, fails to show a polysilicon capping-layer between the WSi layer **250** and the additional capping layer **260**. Chang, on the other hand, teaches that a polysilicon capping layer between Lien's WSi layer and his additional capping layer can be used to prevent any potential peeling or cracking of the underlying silicide layer (see, e.g., col.6/ll.1-2).

Accordingly, it would have been obvious at the time of the invention to one of ordinary to have a polysilicon capping layer between Lien's WSi layer and additional capping layer, as taught by Chang, to prevent cracking of the silicide layer.

13. Regarding claims 17 and 18, Lien teaches (see, e.g., col.3/ll.47) that the additional capping layer is SiN, which is antireflective layer.

14. Regarding claim 19, Chang shows that the additional capping layer may be a SiON layer (see, e.g., col.6/ll.3).

Response to Arguments

15. The applicant argue:

Lien does not show a plurality of core spacers as recited in claim 2. Lien differently shows a protective layer **400** used to protect the layer during a salicide process. Spacers, on the other hand, are used to isolate gate from source/drain contacts.

The examiner responds:

Lien's spacers **400** (see, e.g., fig. 7) are used to isolate the gate stack from a source/drain contact **700**. Nonetheless, the fact that the spacers also protect the gate stacks during a salicide process does not oppose the fact that they are spacers. See, e.g., Sun (abstract, col.3/ll.58-67, and col.5/ll.65-col.6/ll.5) who, in a similar configuration to Lien's, uses spacers to protect gate stacks during damaging process steps.

16. Applicant's arguments with respect to claims 4-6 and 16-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

18. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

19. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

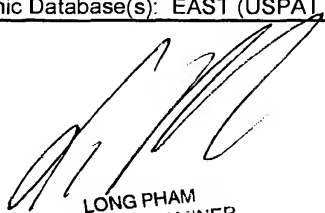
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20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(703) 308-6558** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

21. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

22. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/288,314-326,368-377,382-385,390,391; 438/142,197,257-267,275,283,584-588,592,652	11/19/2003
Other Documentation: PLUS Analysis	2/13/2003
Electronic Database(s): EAST (USPAT, EPO, JPO, PGPub)	11/19/2003


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